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Patterns of university teachers' approaches to teaching, professional development and perceived departmental cultures

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Many studies have been conducted about academics' approaches to teaching, professional development and perceived departmental culture, but their interconnectedness has been considered to a lesser extent. The research presented here examined these patterns comparatively by disciplinary fields and years of teaching experience. Three inventories were filled in by 1141 academics from one Finnish and two Hungarian universities. Based on a hierarchical cluster analysis, four patterns emerged: (1) *Experimenters with diverse teaching approaches*; (2) *Experimenters perceiving their department's culture as most supportive and collaborative*; (3) *Individualistic knowledge-focused teachers*; and (4) *Student-thinking oriented but professionally unintegrated teachers*. About 45% of the teachers belonged to the first group. Academics in the last two groups were less open to professional development; in the third group, this was particularly true for academics working in the field of hard sciences, and in the fourth for those who had less than two years of teaching experience.

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Introduction

Higher education (HE) systems are globally challenged by the fast-changing society, globalisation, and technological development. Pressures on the university staff have increased since high participation rates in tertiary level have resulted in increased class sizes, and students more diverse in age, experience, cultural background and socioeconomic status. In addition, there are other pressures related to tighter budgets, limited resources, accountability, quality assurance, increased research and development that burden the staff. At the same time there is inequality in access, processes of privatisation and increasing competition taking place at the institutions (Altbach, Reisberg, and Rumbley 2009; Mulryan-Kane 2010).

In the European Union, member states have responded to these challenges with a development scheme called the Bologna Process and by agreeing on common policies and

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principles that are manifested in the developments of the European Higher Education Area (EHEA). Since the harmonisation of degree structures and qualification frameworks, the Bologna Process has given priority to the social dimension of HE, lifelong learning, employability, and educational research and innovation (European Commission/EACEA/Eurydice 2015). The EHEA standards and guidelines for quality assurance emphasise high staff competence, a student-centred approach to teaching, flexible learning paths, individual needs of students, competence-based education and learning outcomes and generic skills (ENQA 2015). All of these trends are accompanied with increasing concern about and attention to the quality of university pedagogy, practices of teaching and learning, and the professional development (PD) of university teachers (e.g. Hénard and Leprince-Ringuet 2008; OECD IMHE 2010; Saroyan and Frenay 2010; Gunn and Fisk 2013). Despite the increasing interest in the quality of teaching at universities, in most countries there are no formal qualifications for university teachers, and the research–teaching balance has often been seen as creating tension in academics’ working life (e.g. Marsh and Hattie 2002; Leisyte, Enders, and de Boer 2009).

Many studies have been conducted about academics’ conceptions of learning and approaches to teaching (e.g. Kember and Kwan 2000; Parpala and Lindblom-Ylänne 2007; Prosser, Martin, and Trigwell 2007; Wegner and Nückles 2015). Also, professional development of university teachers (Åkerlind 2003, 2011; Gibbs and Coffey 2004; Postareff et al. 2007; Knight, Tait, and Yorke 2006; Stes et al. 2012; Trautwein 2018) and departmental cultures (Knight and Trowler 2000) have received more attention recently. However, the interconnections between these have been considered to a lesser extent. Academics’ approaches to teaching and their ways of PD cannot be separated from their context. Teachers’ perceptions of their departmental culture are an essential factor in understanding their teaching practice. This question is seldom studied in the context of university education. Therefore the aim of the present study was to examine not only university teachers’ approaches to teaching and PD but also to explore more holistic patterns and interconnectedness of teachers’ teaching approaches, PD and perceived departmental cultures. As earlier studies have shown differences between teachers representing different disciplines and phases of teaching experience (e.g. Lindblom-Ylänne et al. 2006; Stes and Van Petegem 2014), our focus is also on comparing these different teacher groups.

Our study was conducted at one Finnish and two Hungarian universities as both countries belong to the EHEA and have similar degree structures. Initiatives have been launched to support university teachers’ teaching and professional development in both countries. Academics’ work profiles, usually including both teaching and research, are also similar. In neither of the countries is a teaching qualification required by the national regulations but in Finland the teacher qualification (60 ECTS) is available. Educational policy context differs between the countries: in Finland, the university autonomy was strengthened in 2010, whereas in Hungary the centralisation of the financing of HE in 2011 decreased the autonomy. Due to political turbulence, regulations change often in Hungary, while the Finnish political environment has remained more stable.

In the following sections, we first review previous studies on teachers’ approaches to teaching, PD, and perceived departmental cultures, after which we present methods and findings of the present study.

Approaches to teaching among university teachers

Conceptions of teaching and approaches to teaching refer to teachers' personal theories about teaching. Conceptions of teaching are rooted in teachers' beliefs about good teaching, the way teachers construct the meaning of what is to be focused on in teaching and how (Trigwell and Prosser 1996). These conceptions are claimed to be rather stable in nature (Kember and Kwan 2000). Approaches to teaching are based on how university teachers experience the act of teaching in a holistic way (Prosser, Martin, and Trigwell 2007), so the intentions of teaching as well as the chosen strategies to carry out these intentions are included (Trigwell, Prosser, and Taylor 1994). These approaches are influenced by the perceived institutional and curriculum design factors and by students' presage factors (Kember and Kwan 2000; Norton et al. 2005; Ramsden et al. 2007). Teachers' conceptions of teaching have a strong impact on approaches and practices, and because of this teachers do not adopt approaches to teaching that reach beyond the sophistication of their conceptions (Trigwell and Prosser 1996).

In one of the longest established models, Trigwell and Prosser (1996, 2004) identified two main approaches in the Inventory of Approaches to Teaching (Trigwell, Prosser, and Ginns 2005). In the Information Transmission/Teacher-Focused (ITTF) approach, the teacher's intention is to transfer information with little or no build-up of interaction with students. The Conceptual Change/Student-Focused (CCSF) approach focuses on students' prior knowledge and aims at developing or changing students' knowledge, which is accomplished by supporting students' active learning and by encouraging them to take responsibility for their own learning. In the first studies, a Student/Teacher Interaction approach was also found (Prosser, Trigwell, and Taylor 1994; Trigwell and Prosser 1996), which has been strengthened by recent studies but with the reinterpretation of interaction according to situated learning theories (e.g. Wegner and Nückles 2015).

Recently, approaches to teaching have also been reinterpreted because of broadening tasks and more complex practices of university teaching. New teaching tasks have emerged, such as various ways of supporting students' development of generic skills, planning learning outcomes at course and on programme levels, organising online courses, and integrating work practices in studies. For this reason, in our previous study (Tynjälä, Kálmán, and Skaniakos 2019), we developed a new tool to study approaches to teaching. This tool acknowledges the ITTF approach as a *Knowledge-Focused Approach*, whereas the CCSF approach is replaced by two more detailed scales, namely, the *Development of Thinking Skills Focused Approach* and the *Practice-Focused Approach*. Furthermore, a scale called *Learning Outcomes and Requirements Focused Approach* was included.

Several studies have revealed differences between disciplines in teachers' approaches to teaching. Teachers from soft disciplines scored higher on the CCSF scale than their colleagues from hard disciplines (Lindblom-Ylänne et al. 2006; Stes and Van Petegem 2014). Moreover, soft science teachers seemed to explain their teaching approaches on the basis of the culture of their discipline (Stes and Van Petegem 2014). Lindblom-Ylänne and her colleagues (2006) also provided evidence about there being greater differences between soft and hard disciplines than between pure and applied disciplines.

Professional development of university teachers

Hicks et al. (2010) identified four major themes for the PD of university teachers: (1) embedding a student-centred approach, (2) facilitating the scholarship of teaching, (3) initiating and building up networks and relationships, and (4) introducing staff to institutional policies. Regarding these areas, research studies mainly have focused on how the student-centred approach can be enhanced by formal pedagogical training. Less emphasis has been given to conceptions of PD than to actual practices of teachers. Only an exceptional study by Åkerlind (2003, 2011) analysed how university staff interpreted their PD as teachers. Three increasingly complex and differentiated conceptions emerged. The *teacher comfort focused* experience does not include the perspective of change; these teachers become more confident but put less effort into teaching. A more complex experience, *teaching practice focused*, is seen when an academic develops his or her teaching practice, mainly expanding content knowledge as well as the repertoire of teaching strategies. The last and most complex development view as a teacher, *student learning focused*, occurs when the development aims at improving students' learning.

Research provides robust evidence that formal pedagogical training programmes have a positive impact on university teachers' approaches to teaching, and to a lesser extent on teachers' behaviour as perceived by students and on students' learning (e.g. Gibbs and Coffey 2004; Cilliers and Herman 2010; Stes and Van Petegem 2011). Only a questionnaire survey conducted in the UK (Norton et al. 2005) revealed controversial results, showing no differences between academics who attended and those who had not attended PD programmes. The duration of pedagogical training programmes plays a crucial role in changing teachers' approaches to teaching. However, this is not a strictly linear relation, since only pedagogical training lasting more than a year seems to have a substantial effect in the form of instilling the student-focused teacher approach (Postareff, Lindblom-Ylänne, and Nevgi 2007). Once effective, the positive impact tends to remain in the long run, as reported in a follow-up study by Postareff, Lindblom-Ylänne, and Nevgi (2008) and affirmed in a study by Stes and Van Petegem (2011). However, the length of academics' teaching experience did not influence the development of their teaching approaches as much (Postareff, Lindblom-Ylänne, and Nevgi 2007).

The positive effects of training programmes can be intertwined with other forms of support provided by institutions that offer pedagogical training (Gibbs and Coffey 2004; Remmik et al. 2011). It has been highlighted (e.g. Thomas et al. 2011) that when the PD activity is followed by a departmental intervention, the student-focused teaching approach is more likely to be sustained. All in all, it is hard to separate the impact of formal pedagogical training programmes from informal methods and unconscious learning activities (e.g. Williams 2003), but it is also essential to identify the interrelation between formal pedagogical training methods and other types of PD practices. To do so, the framework of professional learning communities is most often applied.

In a review study, Vescio and his colleagues found (2008) sound evidence of the positive impact of professional learning communities motivating teachers to develop their teaching practice in a more student-centred direction. Professional learning communities enhanced the teaching culture, which increased collaboration focused on student learning, teacher authority or empowerment and continuous learning, and also increased student achievement. However, these promising results have not yet been widely affirmed in the university

context. Identifying this impact is still a challenge (Arthur 2016), and only some studies have revealed the impact of professional learning communities on academics' development and teaching practices. For example, Warhurst (2006) highlighted the essential influence of a course-based university teaching community of practice, rather than that of departments (which were found to be weak as communities of practice), on newcomers' teaching practices. A study conducted at the Open University (Knight, Tait, and Yorke 2006) showed that three major sources for PD were: (1) on-the-job learning, (2) the experience of having been taught in HE, and (3) conversations with colleagues in subject departments as well as attending workshops and conferences. The third category is the most similar, yet only partly, to how professional learning communities function. At Miami University, Cox (2013) analysed a more than 30-year-long practice of faculty learning communities; the university provided a structured, multidisciplinary, year-long and voluntary way for developing learning communities. Based on their self-reports, early-career academics who participated in the faculty learning communities felt a positive impact on their interest in teaching and in the scholarship of teaching, and experienced increased comfort as members of the university community.

The impact of the type of disciplinary field on university teachers' PD has been explored less than the disciplinary influence on approaches to teaching. However, in his study, Lueddeke (2003) identified different types of PD for academics from four disciplinary fields. Academics from the business field were especially interested in strengthening their links to knowledge resources, such as staff knowledgeable in technology-oriented systems for peer review and monitoring of curricular development, while teachers of social sciences focused on student learning as an area of intellectual pursuit, and nursing staff were involved in innovative curricular development and research.

Since PD activities are seldom examined among university teachers, in our previous study (Tynjälä, Kálmán, and Skaniakos 2019), we developed such scales and labelled them: (1) *Research-Focused and Formal Professional Development Activities*, (2) *Experimenting in Teaching*, and (3) *Sharing Teaching Practices with Colleagues*. These were used in the present study as well.

Perceived professional cultures of university departments

Knight and Trowler (2000) have drawn attention to the role of departmental culture in improving teaching. According to them, without interactional leadership (based on directed collegiality) and a supportive working culture in departments, changes in teaching might result in a compliance culture, which would mean change without essential transformation. The studies on academics' PD suggest that one of the main challenges is that the positive impact of teaching programmes often meets obstacles in the academics' own departments. Even when newcomers form a professional learning community for developing their teaching practice (Warhurst 2006; Cox 2013), this professional learning community and the departmental communities of practice are loosely connected, and thus their meaning making regarding teaching can differ greatly.

Prosser et al. (2003) found that, among established university teachers, there was a strong link between teaching approaches and the perception of the teaching context, whereas this link was not apparent among junior tutors or demonstrators. The results also showed that students engaged in a deep approach to learning in courses of senior

teachers, whose approaches to teaching were coherently related to their perception of the teaching context. These findings suggest that the influence of contextual factors on approaches to teaching is more relevant among teachers with more experience (Prosser et al. 2003). In a related study, Ramsden and his colleagues (2007) added further elements of the perception of the university context, such as leadership in teaching, collaborative management of teaching, collegial commitment to student learning, and regarding the context of classroom teaching, such as class size, student characteristics and teacher control. Their structural model confirmed that leadership in teaching and collaborative management have an indirect effect on approaches to teaching via collegial commitment to student learning and the perceived context of classroom teaching.

In order to understand departmental professional cultures in a more sophisticated way, the present study built on the theory of Hargreaves and Fullan (2012) developed in regard to the school context. Based on their study of how school cultures work, Hargreaves and Fullan (2012) identified five different types of professional culture: (1) individualism, (2) Balkanisation, (3) contrived collegiality, (4) professional learning communities, and (5) clusters, networks, federations. In the *individualistic* school culture, teachers work in isolation from colleagues and face the challenges of their job alone. In contrast, in collaborative school cultures, teachers work together both in formal and informal ways. The authors have given the title *Balkanisation* to a culture where separate groups of teachers form cliques and sometimes also compete with each other. The connections between the groups are loose and communication scarce. In this kind of culture, innovations are not shared between the groups. The culture of *contrived collegiality* represents a regulated collaboration based on bureaucracy and formal collaborative activities. While contrived collegiality is superficial and may impede real improvement, arranged formal collaboration can sometimes be a first step toward establishing a new collaborative culture. In *professional learning communities*, collaboration is built upon teachers' voluntary working in flexible groups and sharing knowledge in order to improve their teaching practices. Finally, when educational institutions realise that they cannot meet the challenge of improving their practice by working alone, they may form *clusters, networks, and federations*. On the basis of these categories, we developed a questionnaire regarding HE teaching cultures as part of our previous study (Tynjälä, Kálmán, and Skaniakos 2019). The questionnaire will be introduced in the Methods section.

Aim of the study

In our previous study (Tynjälä, Kálmán, and Skaniakos 2019), we examined differences in university teachers' teaching approaches, professional development and departmental teaching cultures between Finland and Hungary. In the present study, we moved the focus from differences between the countries onto different teacher groups and identify, based on the same dataset, more general patterns regarding teaching. In more detail, the following questions were addressed:

- (1) Are there differences in teachers' approaches to teaching, their professional development and their perceptions of teaching cultures between hard and soft sciences?

- (2) Are there differences in teachers' approaches to teaching, professional development and their perceptions of teaching cultures between teachers with different amounts of teaching experience?
- (3) What kind of patterns can be identified regarding academics' approaches to teaching, professional development activities and the perceived departmental professional cultures?

Methods

Data collection and sample

Data for the study were collected using an online survey at one Finnish and two Hungarian HE institutions, both outside the capital city area. The Finnish and English versions of the survey were sent to teachers at one research-intensive Finnish university with seven faculties. Selected parts of the survey were translated from English into Hungarian, and the Hungarian version was sent to teachers of two Hungarian HE institutions: one research-intensive university and one university of applied sciences. The study fields of the two Hungarian universities represent the same fields as the seven faculties of the Finnish University. The standards of *Ethics for Researcher* (EC 2013) were followed. Thus, for example, the participants were informed of the research goals, procedures and voluntariness, and the data were collected anonymously.

Altogether 1141 academics answered the questionnaire: 58.5% ($n = 667$) came from Finnish and 41.5% ($n = 474$) from Hungarian universities. In the Hungarian sample, 77.2% of the respondents worked at the research university and 22.8% at the university of applied sciences. The response rate in the Finnish sample was much higher (45%) than at the Hungarian HE institutions (20% and 33%, respectively).

University teachers' disciplinary fields were categorised as either hard (e.g. mathematics and engineering) or soft sciences (e.g. education and humanities) according to Biglan (1973), but teachers representing multidisciplinary fields such as the sports and health sciences and units such as open university were left out. The teachers were distributed almost equally between hard ($N = 438$, 47.8%) and soft sciences ($N = 478$, 41.9%), as well as between women and men (48.6% and 52.2%). About half of the sample consisted of teachers with 10 or more years of experience ($N = 595$, 52.1%), while almost one-third (31.5%) of the teachers had 3–9 years and 15.6% only two years or less teaching experience. About half of the participants (53.5%) came from the field of teacher education in the Hungarian sample. The percentages of the Finnish and Hungarian sub-samples regarding disciplinary fields, teaching experience, gender and academic degree title can be found in Table 1. In the Finnish sample, the academics were also asked if they had a permanent or fixed-term job.

Questionnaire

The questionnaire included three inventories: the first asked about teachers' teaching approaches and practices (ITAP, Tynjälä, Kálmán, and Skaniakos 2019), the second about their professional development (IPD, Tynjälä, Kálmán, and Skaniakos 2019), and the third about their perceptions of departments' teaching cultures (DPQ, Tynjälä,

Table 1. The main characteristics of the Finnish and Hungarian sub-samples.

Academics' distribution (%) within the Finnish and Hungarian sub-samples		FIN %	HUN %
Disciplinary fields	Hard sciences*	41.1	56.7
	Soft sciences*	58.9	43.3
	Overall	100	100
Teaching experience	2 or less than 2 years	22.7	5.9
	3–9 yrs	34.8	27.3
	10 or more years	42.4	66.7
	Overall	100	100
Gender	Women	49.9	47.9
	Men	50.1	52.1
	Overall	100	100
Job titles	Professor	14.8	61.4
	Researcher	33.9	2.3
	Doctoral student	19.3	1.7
	Teaching staff	31.9	26.1
	Overall	100	100
Academic degree	Staff without PhD	64.2	64.8
	Staff with PhD or higher scientific degree**	35.8	35.2
	Overall	100	100

*In the case of the 'sport and health sciences' and other multidisciplinary units, the hard versus soft distinction cannot be defined clearly and was thus excluded from the comparison of teachers from the fields of hard and soft sciences.

**Hungarian academics, after the acquisition of the PhD, can defend a habilitation; and after that they can apply to become a Doctor of the Hungarian Academy of Sciences.

Kálmán, and Skaniakos 2019). In addition, background questions were included, such as the respondents' gender, job title and educational background.

The Inventory of Teaching Approaches and Practices (ITAP) consisted of four scales, namely, the: (1) *Knowledge-Focused Approach*, including statements such as, 'In my teaching, I concentrate on presenting high-quality information to students', and 'As a teacher, I am responsible for students being able to create a good understanding of the topic'; (2) *Learning Outcomes and Requirements Focused Approach*, which included the statements, 'At the beginning of the course, I introduce the learning outcomes of the course to my students', and 'At the beginning of the course, I introduce the assessment criteria for learning outcomes to my students'; (3) *Practice-Focused Approach* with questions such as, 'Students need to combine theory and practice in my learning assignments', and 'I connect the content of my courses to practical training or exercises'; and (4) *Development of Thinking Skills Focused Approach*, which included, for example, the following questions: 'When teaching, my aim is to help students question their everyday thinking about the studied topics', and 'I try to raise discussion with students about the topics we are studying'.

The questions of the Inventory of Professional Development (IPD) were based on previous studies identifying various forms of teacher development (Wei et al. 2009; Tynjälä and Heikkinen 2011). The inventory included the following scales: (1) *Research-Focused and Formal Professional Development Activities* with statements such as, 'I read pedagogical literature', and 'I conduct pedagogical research on my teaching'; (2) *Experimenting in Teaching*, including, for example, the following questions: 'I develop and test new teaching methods together with colleagues', and 'I use feedback from students to develop my teaching'; and (3) *Sharing Teaching Practices with Colleagues*, which included the following questions: 'I observe the way my colleagues are teaching', and 'I discuss teaching and its development with colleagues in unofficial connections'.

The items for the Departmental Cultures Questionnaire (DCQ) were derived from Hargreaves and Fullan's (2012) descriptions of different cultures in teaching communities, and

included the following scales: (1) *Culture of Departmental Support of Teaching*, which included, for example, the statements, ‘In my department, teaching is appreciated as much as research’, and ‘In my department, it has been ensured that students receive sufficient guidance and counselling’; (2) *Training- and Project-Centred Culture* with items such as, ‘Teachers’ participation in pedagogical training is made possible in my department’, and ‘My department often has teaching development projects’; (3) *Culture of Voluntary Collegial Collaboration*, including, for example, the following statements: ‘Teachers at my department often collaborate voluntarily’, and ‘All teachers in my department participate in the creation of our curriculum’; and (4) *Individualistic and Cliques Culture*, which included the statements: ‘Everyone takes care of his/her own teaching and there is not much collaboration’, and ‘Teacher collaboration occurs mostly in official meetings’, and ‘Teachers form cliques in our department’.

The teachers responded to the statements of the ITAP and DCQ on a Likert-type scale (1 = *completely disagree*, to 5 *completely agree*). PD activities were measured with a scale from 0 to 2 (0 = *never*, 1 = *seldom*, and 2 = *often*). A sum frequency of all PD activities was calculated based on the 11 statements of PD activities, and it ranged from 0 to 22.

Factor analyses using the principal component method and oblique rotation were conducted with the variables related to approaches to teaching, professional development, and perceived professional cultures. The average sum variables of each factor were calculated to develop the scales (Tynjälä, Kálmán, and Skaniakos 2019). The differences between university teachers of soft and hard sciences were calculated with an independent *t*-test, and for differences between teachers representing different length of teaching experience, analysis of variance (ANOVA) was used. Finally, to answer the third research question, a hierarchical cluster analysis was performed using Ward’s method. The cluster analysis was used to identify groups of university teachers who showed different patterns in approaches to teaching, professional development, and perceived professional culture. Hierarchical clustering using Ward’s method was selected to make sure that teachers within a group were optimally similar. An agglomerative strategy and dendrogram were used to check how teachers were hierarchically grouped. Solutions with two to ten clusters were tested in the search for the optimal number of groups. The optimal number of teachers’ groups was four. This was also checked with a two-step cluster analysis, where the four solutions were the best option in the silhouette measure of cohesion and separation within the fair interval.

Results

Differences between hard and soft sciences and between teachers with different amounts of work experience

Differences in university teachers’ approaches to teaching and practice

The study showed that academics from the fields of soft and hard sciences approached teaching differently. Teachers from hard sciences preferred the *knowledge-focused approach* ($M = 3.90$, $SD = .75$, $t(849) = -2.91$, $p = .004$) as opposed to teachers of soft sciences, whose practices were characterised more by the *practice-focused approach* ($M = 3.70$, $SD = .72$, $t(802.096) = 5.96$, $p < .001$), the *development of thinking skills approach* ($M = 4.11$, $SD = .66$, $t(784.743) = 7.30$, $p < .001$), and the *learning outcomes and requirements focused approach* ($M = 4.23$, $SD = .87$, $t(740.792) = 4.13$, $p < .001$).

Teachers who had more teaching experience had higher scores regarding every teaching approach. The difference was significant in three out of four approaches (practice-focused approach: $F(2,1046) = 15.54, p < .001$; development of thinking skills approach: $F(2,1049) = 9.00, p < .001$; knowledge-focused approach: $F(2,1047) = 10.13, p < .001$), as shown in [Table 2](#).

Differences in university teachers' professional development

The frequency of all types of PD activities (from 0 to 22) varied significantly by the length of teaching experience ($F(2,1036) = 4.38, p.013$). Academics with more teaching experience participated in PD activities more often. Teachers with 10 or more years of teaching experience most frequently engaged in PD activities ($M = 12.26, SD = 4.54$), followed by teachers with 3–9 years of teaching experience ($M = 11.97, SD = 4.28$). Those with less than two years of teaching experience participated least regularly in PD activities ($M = 10.97, SD = 4.33$). [Table 3](#) shows the means of different forms of PD activities by the length of teaching experience (on the original 0–2 scale). On the one hand, academics with more teaching experience focused more on experimenting in teaching and on research-focused and formal PD activities, while, on the other hand, teachers with less teaching practice relied more on sharing teaching experiences with colleagues for PD. In other words, beginning teachers preferred activities of observing other teachers' practices and getting feedback more so than did their more experienced colleagues.

Furthermore, teachers from the soft disciplines participated more often in PD activities than teachers from hard disciplines (Soft disciplines: $M = 12.85, SD = 4.1$; Hard disciplines: $M = 10.27, SD = 4.17, t(838) = 9.00, p < .001$). When comparing the PD practices of teachers from different disciplines, we found that sharing teaching practices with colleagues was equally important for teachers from different disciplines. However, academics from soft disciplines had more PD practices of experimenting in teaching (Soft disciplines: $M = 1.53, SD = .42$; Hard disciplines: $M = 1.29, SD = .49, t(775.300) = 7.43, p < .001$) and research-focused and formal activities for PD (Soft disciplines: $M = .89, SD = .56$; Hard disciplines: $M = .51, SD = .50, t(837.440) = 10.33, p < .001$).

Differences in academics' perceptions of professional cultures

The comparison between teachers with different lengths of teaching experience showed that academics with longer teaching experience recognised the features of each type of

Table 2. Teachers' approaches to teaching according to disciplines and the length of teaching experience.

	Practice-focused approach		Development of thinking skills approach		Knowledge-focused approach		Learning outcomes and requirements focused approach	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
University teachers from soft disciplines	3.70	.72	4.11	.66	3.75	.78	4.23	.87
University teachers from hard disciplines	3.39	.81	3.75	.78	3.90	.75	3.94	1.14
Significance	$p < .001$		$p < .001$		$p = .004$		$p < .001$	
University teachers with less than 2 years of teaching experiences	3.35	.86	3.76	.84	3.63	.82	3.95	1.06
University teachers with 3–9 years of teaching experiences	3.50	.79	3.92	.71	3.74	.75	4.07	1.00
University teachers with 10 or more years of teaching experiences	3.72	.74	4.04	.71	3.92	.74	4.16	.99
Significance	$p < .001$		$p < .001$		$p < .001$		No	

Table 3. Differences in PD activities by the length of university teachers' teaching experience.

PD activities	Years of teaching experiences in HE	N	M	SD	F	P
Research-focused and formal PD activities	Less than 2 years	124	.59	.55	8.85	.001
	3–9 years	346	.76	.56		
	10 years or more	569	.83	.60		
	Total	1039	.78	.58		
Experimenting in teaching for PD	Less than 2 years	124	1.28	.52	7.07	.001
	3–9 years	346	1.43	.44		
	10 years or more	569	1.45	.46		
	Total	1039	1.42	.47		
Sharing teaching practices with colleagues for PD	Less than 2 years	124	1.40	.46	4.92	.007
	3–9 years	346	1.30	.43		
	10 years or more	569	1.26	.44		
	Total	1039	1.29	.44		

Note: The PD activities were categorised from 0 to 2.

professional culture more profoundly (Culture of departmental support of teaching: $F(2,1092) = 35.94$, $p < .001$; Training- and project-centred professional culture: $F(2,1092) = 45.52$, $p < .001$; Culture of voluntary collegial collaboration: $F(2,1092) = 73.33$, $p < .001$; Individualistic and cliqued culture: $F(2,1095) = 27.28$, $p < .001$).

University teachers from either soft or hard disciplines perceived the culture of departmental support of teaching and the individualistic and cliqued culture similarly. However, in their perceptions of the training- and project-centred culture ($t(880) = 4.00$, $p < .001$) and voluntary collegial collaboration ($t(880) = 3.86$, $p < .001$), significant differences were found: academics from soft disciplines perceived the training- and project-centred culture ($M = 3.18$, $SD = 1.36$) and voluntary collegial collaboration ($M = 3.45$, $SD = 1.24$) more strongly than did the teachers from hard disciplines (Training- and project-centred professional culture: $M = 2.80$, $SD = 1.40$; Voluntary collegial collaboration: $M = 3.13$, $SD = 1.20$).

Patterns in university teachers' teaching practices, professional development, and perceived professional cultures

Based on a hierarchical cluster analysis using Ward's method, four well-confinable clusters were identified: (1) Experimenters with diverse teaching approaches; (2) Experimenters perceiving their department's culture as most supportive and collaborative; (3) Individualistic knowledge-focused teachers; and (4) Student-thinking oriented but professionally unintegrated teachers (see Table 4).

The largest group of teachers ($n = 464$), representing almost half of the sample (44.62%), were *experimenters with diverse teaching approaches*. The scores for the four teaching approaches were the highest in this cluster, which means that every teaching approach was highly relevant for these teachers. This group is also the most active in almost all types of PD activities. Despite applying diverse teaching approaches, experimenting, sharing and investigating their teaching practices to the highest degree, they did not perceive their departmental professional culture as supportive as did the following group of teachers. Nonetheless, the most relevant aspects of the professional culture of their department were: supporting teaching, working in groups voluntarily, and deeming training and developmental projects important.

Table 4. Teaching approaches (1–5 Likert-type scale), types of PD activities (0–2 categories of frequency), and the perceived professional culture of the department (1–5 Likert-type scale) in the four groups of university teachers (Ward's method).

		Clusters					
		Scales (Cronbach's alpha and the number of items)	Experimenters with diverse teaching approaches	Experimenters perceiving their department's culture as most supportive and collaborative	Individualistic knowledge-focused teachers	Student-thinking oriented but professionally unintegrated	Total
N (%)	All university teachers		464 (44.6%)	276 (26.5%)	252 (24.2%)	48 (4.6%)	1040 (100%)
	Finnish University teachers		227 (37.5%)	206 (34.0%)	131 (21.7%)	41 (6.8%)	605 (100%)
	Hungarian University teachers		237 (54.5%)	70 (16.1%)	121 (27.8%)	7 (1.6%)	435 (100%)
Teaching approaches	Practice-focused	0.85 8 items	4.02* (.57)	3.35 (.64)	2.84 (.70)	3.42 (.84)	3.53 (.80)
	Development of thinking skills	0.82 6 items	4.39* (.48)	3.84 (.62)	3.31 (.70)	4.12 (.66)	3.97 (.73)
	Knowledge-focused	0.75 4 items	4.22* (.58)	3.48 (.72)	3.47 (.73)	3.79 (.86)	3.82 (.76)
	Learning outcomes and requirements focused	0.75 4 items	4.63* (.54)	4.01 (.90)	3.26 (1.14)	4.10 (.91)	4.11 (1.00)
PD activities	Research-focused and formal	0.86 5 items	1.01* (.57)	.79 (.54)	.38 (.39)	.56 (.39)	.78 (.58)
	Experimenting in teaching as PD activity	0.61 3 items	1.58 (.37)	1.60* (.33)	.96 (.43)	1.33 (.49)	1.42 (.47)
	Sharing practices with colleagues	0.60 3 items	1.39* (.43)	1.34 (.34)	1.06 (.48)	1.35 (.49)	1.29 (.44)
Perceived professional culture of department	The culture of departmental support of teaching	0.89 6 items	3.67 (1.11)	3.76* (.90)	3.05 (1.11)	1.47 (1.45)	3.44 (1.19)
	Training- and project-centered professional culture	0.75 3 items	3.30 (1.27)	3.80* (.97)	2.54 (1.05)	.90 (1.01)	3.14 (1.31)
	The culture of voluntary collegial collaboration	0.77 3 items	3.63 (.98)	3.87* (.79)	3.02 (.94)	.70 (.91)	3.41 (1.14)
	Individualistic and cliqued culture	0.75 3 items	2.99 (.97)	2.50 (.93)	3.19* (1.01)	1.28 (1.58)	2.83 (1.09)

Note: The highest score within each clustered group is in italics. The highest score for each variable is marked with an asterisk*. The number of items and reliability of the scales are presented in the authors' previous study (Tynjälä, Kálmán, and Skaniakos 2019).

The second largest group of teachers ($n = 276$), namely, the *experimenters perceiving their department's culture as most supportive and collaborative*, applied similar and diverse teaching approaches as the previous group of experimenters with diverse approaches, but they had slightly lower scores for every teaching approach. Also, their most substantial PD activity was experimenting in teaching. Despite the similarities, they differed fundamentally from the previous group in that they perceived their departmental culture to be the most supportive and collaborative in nature.

Individualistic knowledge-focused university teachers ($n = 252$) preferred to use knowledge-focused teaching approaches. They had the lowest participation rate in all PD activities compared to the other teacher groups, and they almost never participated in any research-focused or formal PD activities. These teachers mostly perceive the professional culture of their department as characterised by working alone or in cliques.

A small group of teachers ($n = 48$) belonged to the group of *student-thinking oriented but professionally unintegrated teachers*. These teachers emphasised the development of thinking skills approach, although they found the learning outcomes and requirements focused approach almost as important. For their PD, they mainly chose sharing their experiences with colleagues or experimenting in their teaching practice. This group of teachers was practically unaware of any kind of professional culture of their department; they had the lowest scores among the teachers' groups with respect to every type of professional culture.

Differences between the clusters of university teachers

The clusters of university teachers significantly differed in regard to their disciplinary fields ($\chi^2(3) = 49.31$; $p < .001$), teaching experience ($\chi^2(6) = 64.54$; $p < .001$), HE institutions ($\chi^2(6) = 79.70$; $p < .001$), gender ($\chi^2(3) = 49.90$; $p < .001$), and job title ($\chi^2(9) = 85.38$; $p < .001$). Furthermore, there were significant differences in nationalities ($\chi^2(3) = 65.68$; $p < .001$). *Experimenters perceiving their department's culture as most supportive and collaborative* (F:34.0% H:16.1%) and *Student-thinking oriented but professionally unintegrated teachers* (F:6.8% H:1.6%) were more typical among Finnish university teachers on the one hand, *Experimenters with diverse teaching approaches* were more frequent within the Hungarian sample on the other hand (see Table 4). The group of *Individualistic knowledge-focused university teachers* did not differ to a great extent regarding nationalities (F:21.7% H:27.8%).

Experimenting with diverse teaching approaches was more common among teachers from soft disciplines (62.5% from soft and 37.5% from hard disciplines) and female academics (58.8% female and 41.2% male teachers). Teachers with 10 years or more teaching experience were slightly overrepresented in this cluster (60% compared to 54.5% of teachers in the whole sample). Participants with a teaching-dominated job title (as opposed to researchers) had the highest percentage in this cluster (40.7% compared to 32.4% in all clusters together). The cluster of *experimenters perceiving their department's culture as most supportive and collaborative* was also more typical among university teachers from soft disciplines (58.8% compared to 41.2% of teachers from hard disciplines). Few teachers had 2 years or less than 2 years of teaching experience in this cluster (6.9% compared to 11.9% in the whole sample). Compared to the overall sample, there were no substantial differences in regard to the job titles of these academics; however, within the Finnish sample more teachers had permanent jobs (56.8%) than fixed-term ones

(43.2%) compared to the whole sample (42.9% with permanent and 57.1% with fixed-term jobs).

The pattern of *individualistic knowledge-focused university teachers* was more typical for teachers of hard disciplines (66.7% from hard and 33.3% from soft disciplines) and for males (68.1% male and 31.9% female teachers). In this group, proportionately more doctoral students (17.4%) and researchers (11.4%) but less participants with a teaching-dominated job title (20.7%) were represented compared to the whole sample (doctoral students: 11.4%, researchers: 19.6%, staff with a teaching-dominated job title: 32.4%). Also, among the Finnish participants the number of fixed-term teachers ($n = 92$, 70.2%) was more than twice as high as that of permanent ones ($n = 39$, 29.8%).

In the group consisting of *student-thinking oriented but professionally unintegrated teachers* proportionately more female academics (60.4%) as well as researchers (39.6% compared to 19.6% in the whole sample) and doctoral students (31.3% compared to 11.4% in the whole sample) were represented in this group. Teachers from the soft (48.8%) and hard disciplines (51.2%) were equally represented, but teachers with the least amount of teaching experience (42.6% compared to 11.9% in the whole sample) and with fixed-term jobs (87.8% compared to 57.1% of the whole Finnish sample) were overrepresented in this group.

Discussion

The purpose of the present study was twofold: firstly, to examine the differences between specific subgroups of teachers; and secondly, to identify holistic patterns in teachers' approaches to teaching, their PD activities and perceived departmental culture.

Previous studies have thoroughly examined the differences in approaches to teaching between university teachers of soft and hard sciences (e.g. Lindblom-Ylänne et al. 2006), but the differences in PD and teachers' perceptions of departmental culture have been less explored. Our findings affirmed and elaborated the results of the previous studies: teachers from hard sciences found the knowledge-focused teaching approach more important than academics from soft disciplines, who were rather committed to the practice-focused approach, the development of thinking skills approach, and the learning outcomes and requirements focused approach. Academics from soft sciences were also more involved in research-focused and formal PD activities and found experimenting in teaching more relevant to their practice than academics from hard disciplines. The most common form of PD, namely sharing teaching practices with colleagues, was found to be equally important for both groups of teachers. Theoretically, a coherent picture was recognised: teachers from soft sciences used more student-focused approaches and were proportionately more involved in research-focused learning activities and formal training, and they were more open to experimenting in their teaching practice. However, teachers from soft and hard sciences perceived the departmental support for teaching equally strong. Teachers from soft disciplines found the voluntary collegial collaboration and the training- and project-centred culture more relevant, which can be indicators of working and learning in professional learning communities (Hargreaves and Fullan 2012).

Our results show that academics' teaching experience can make a difference. The more experience teachers had, the more they found almost all types of teaching approaches relevant. Our results partly affirm the findings of Postareff and her colleagues (2007); in their

study, the teachers with the least and most teaching experience scored highest on the Information Transmission/Teacher-Centred Approach scale as well as the Conceptual Change/Student-Focused scale. Similarly, in our study the knowledge-focused approach to teaching was more common among experienced teachers, which supports the idea that the development of teaching approaches can lead to the use of more versatile approaches to teaching. The only exception of the role of experience was the learning outcomes and requirements focused approach, in regard to which no significant differences were found concerning the length of teaching experience. This approach consists mainly of teaching goals and requirements without teaching concepts and strategies, and it is strongly supported by EU policies as well as international and national strategies for HE. These factors can lead to a wide acceptance of the learning outcome and requirements focused approach without coherently integrating learning outcomes with other student-centred concepts and strategies.

The most frequent activity of PD was experimenting, trying out new teaching methods. This form of PD has not been prominently featured in other studies (for an exception, see e.g. Knight, Tait, and Yorke 2006). Experimenting varied significantly according to the length of teaching experience. While university teachers with more experience relied more on experimenting as a PD activity, teachers with two years or less experience more commonly chose to share teaching experiences with colleagues. Research-focused and formal learning activities were the least frequent PD activities overall: the more experience teachers had, the more they were committed to these activities. The low participation rate of novice teachers in formal pedagogical training suggests that they are not voluntarily committed to formal pedagogical training but rather rely on informal ways of sharing teaching practices. This is an important factor to be taken into account when launching PD activities for new academics in HE. Furthermore, an awareness of all types of professional cultures in their departments is more common among experienced university teachers, which can mean that academics become more aware of the specific features of professional cultures over time. This result is, to some extent, in line with the findings of Prosser et al. (2003), who highlighted that academics with more teaching experience felt the influence of contextual factors on approaches to teaching more strongly than did those with less teaching experience.

Our study revealed four different clusters of university teachers based on their teaching approaches, PD activities and perception of departmental culture: (1) *Experimenters with diverse teaching approaches* (44.62%); (2) *Experimenters perceiving their department's culture as most supportive and collaborative* (26.54%); (3) *Individualistic knowledge-focused teachers* working in an individualistic culture (24.23%); and (4) *Student-thinking oriented but professionally unintegrated teachers* with low awareness of their department's culture (4.61%). The four types of patterns show a partially unexpected result. In the clusters, two types of interconnection between the components emerged. One consists of versatile approaches to teaching, PD activities and perceived departmental culture with high loadings on almost all scales (1st and 2nd clusters). The other type of pattern involves some specific approaches to teaching that mostly lack PD activities or being aware of professional cultures (3rd and 4th clusters). All in all, specific patterns of approaches to teaching, PD activities and perceived professional cultures were identified, which shows that it is important to take all of these into account coherently when aiming to improve teaching and learning in HE.

In Finland and Hungary, almost three-quarters of the teachers in our study experienced their departmental culture positively and considered it to be supportive in teaching. The Finnish teachers were highly represented in the cluster of *Experimenters perceiving their department's culture as most supportive and collaborative* which is in line with previous research study (Jääskelä, Häkkinen, and Rasku-Puttonen 2017) where Finnish teachers felt voluntary collaboration a key component of PD projects. The group of experimenters might play a crucial role in renewing and innovating HE teaching. Especially the group of *experimenters with diverse approaches*, which was more typical for Hungarian teachers than Finnish ones, can be understood as innovators and knowledge sharers, because these teachers were not only experimenting in their teaching but were the most open to research on teaching as well as formal PD activities. Altogether, it seems that despite differences in political environment between Finland and Hungary, in both countries most teachers were committed to develop their teaching.

One of the main results of our study is that it identified the specific subgroups of academics who might have problems with engaging in PD. *Individualistic knowledge-focused teachers* were much less committed to PD activities overall. This means that teachers who focus on transmitting knowledge to students instead of facilitating their learning are unlikely to change their teaching as they do not participate in PD activities that would help them to renew their teaching. In this group, the male teachers working in the field of hard sciences, as doctoral students or researchers, and in fixed-term jobs are more at risk than others. The gender differences may be connected to the male dominance in hard sciences but further research is needed to verify this. The *student-thinking oriented but professionally unintegrated teachers* facilitated the active and constructive learning of students, but their concept of teaching and learning was also mainly individualistic. So, if these teachers were to exist in a vacuum, so to speak, working without a supportive and collaborative professional community, they would lack the support needed to progress to and experience collaborative learning in their work and teaching. This challenge of PD is considerably higher for those teachers who have less than two years of teaching experience, and/or are working as researchers or doctoral students, and/or are in fixed-term jobs.

Our study was subject to some methodological limitations that should be considered. Firstly, the respondent rate was lower in the Hungarian sample, which may have led to the academics with higher commitment to teaching being overrepresented in the sample. Secondly, among the Hungarian academics, more university teachers came from the field of teacher education than from other fields. Thirdly, the Hungarian sample may have been subject to some bias, since the Hungarian academics already knew that the same data had been collected in Finland; they may have consequently polished their answers to a greater extent.

The findings of our study primarily contribute to the improvement of teaching and learning practices in HE through the identification of the key elements promoting professional support. Firstly, the perceived professional culture plays a pivotal role in academics' teaching and professional learning. Particularly for experimenting in teaching and becoming involved in practitioner research and pedagogical training, supportive and collaborative professional cultures are needed. Furthermore, our results show that understanding the professional culture of one's teaching environment is not a quick and automatic process as university teachers with less teaching experience and in fixed-term positions have been found to not really be aware of the professional culture of

their institute. Secondly, the developed instruments for diagnosing the patterns of approaches to teaching, PD and perceived professional culture can help in understanding the need for PD by certain type of teachers. The experimenters with diverse teaching approaches and those experimenters who perceive their professional culture to be highly supportive and collaborative can be identified as the key agents for innovating teaching and learning in HE institutions. Those academics who were less active in experimenting, research-based teaching and pedagogical training found the professional culture to be more individualistic or they were simply less aware of the professional culture in general. Thirdly, these findings indicate that the support for PD cannot rely only on isolated support for specific subgroups but requires joint professional development and learning involving all types of academics (see also Thomas et al. 2016). The inclusion of doctoral students, researchers, academics in fixed-term positions and less experienced university teachers in joint professional development opportunities is crucial for improving teaching and learning in HE.

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No potential conflict of interest was reported by the authors.

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